

ART 34 AMDT

English translation of the amended sheet of International  
Preliminary Examination Report.

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CLAIMS

1. Process for manufacturing a neutron absorbent material, said material being a composite material containing boron carbide and hafnium, comprising the following steps:

- adding hafnium powder to a powder of boron carbide,

- mixing the boron carbide powder and the hafnium powder such as to obtain a homogeneous mixture, and

- sintering the homogeneous mixture at sufficient sintering pressure and temperature to obtain a composite material,

characterized in that the sintering pressure is applied before the temperature of the homogeneous mixture of the powders reaches the sinter reaction temperature of said mixture.

2. Process according to claim 1, in which up to approximately 40% by volume of hafnium is added, the homogeneous mixture of the boron carbide and hafnium powders representing 100% by volume.

3. Process according to claim 1, in which approximately 25% by volume of hafnium is added, the homogeneous mixture of the boron carbide and hafnium powders representing 100% by volume.

~~4. Process according to any of claims 1 to 3, in which the grain size of the boron carbide powder ranges up to approximately 50  $\mu$ m.~~

5      5. Process according to any of claims 1 to 4, in  
which the grain size of the hafnium powder ranges up to  
approximately 20  $\mu\text{m}$ .

5      6. Process according to any of claims 1 to 4, in  
which the grain size of the hafnium powder ranges up to  
approximately 10  $\mu\text{m}$ .

10      7. Process according to claim 1, in which the  
mixture of boron carbide and hafnium powders is made by  
applying ultrasound to a paste containing said powders  
dispersed in a dispersion liquid.

15      8. Process according to claim 1, in which the  
homogeneous mixture is sintered in a vacuum or in an  
atmosphere formed of a neutral gas.

20      9. Process according to claim 1 or 6, in which the  
homogeneous mixture is sintered in a graphite mould  
lined with a graphite sheet.

25      10. Process according to any of the preceding  
claims, in which the mixture is sintered at a  
temperature of approximately 1800°C to 2100°C, at a  
pressure of around 70 to 110MPa for a period of  
approximately 15 to 90 minutes.

11. Process according to any of the preceding  
claims, in which the mixture is sintered at a

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temperature of approximately 2000°C, at a pressure of  
around 92 MPa for a period of approximately 1 hour.

12. Neutron absorbent material containing boron  
carbide and hafnium diboride obtained using a process  
according to any of claims 1 to 11.

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